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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/728,562

12/05/2003

Robert R. Alfano

5250-7

8886

7590

04/18/2005

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EXAMINER

JACKSON JR, JEROME

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 04/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/728,562

Applicant(s)

ALFANO ET AL.

Examiner

Jerome Jackson Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
 Period for Reply.

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31-36 is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>12/5/03</u>   | 6) <input type="checkbox"/> Other: _____                                    |

The drawings are objected to because figures 3 and 8 are obscure. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12,15,16,19-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang '060.

Wang teaches a resonant tunneling light emitter comprising a sapphire substrate, p and n AlGaIn layers, two intrinsic quantum wells, and ohmic contacts. See figure 1.

Claims 1-11,15 are anticipated. Claim 12 is rejected as multiple quantum wells can be substituted for a single quantum well embodiment, column 3 lines 35-45. Claims 16 and 20-30 are rejected as the functional language does not structurally distinguish the claims over Wang which can function in the same manner. Claim 19 is rejected as the wells would be one or the other.

Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang, above.

In regard to claims 13,14,17 and 18, the alternate embodiment comprising MQW typically would comprises same thickness barriers and same material. See the text in column 3. The layers are also semi-insulating as they are not doped.

Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raisky et al APL 7/01 in view of Cho '675.

Raisky teaches a room temperature p-I-n photovoltaic structure comprising InGaAsP/InP materials that absorb at particular wavelengths. The difference between the claims and Raisky is GaN based material. This difference is not patentable because Cho teaches the GaN based material system for its increased conduction band offset and response at more desirable wavelength ranges. Accordingly it would have been obvious to have practiced a p-I-n photovoltaic resonant tunneling structure with GaN based materials from the suggested teachings of Raisky and Cho. Claim 1 does not recited any particular quantum well thicknesses or exact doping levels or material stoichiometry which could distinguish over the wavelength detection suggestions of Cho and accordingly is considered prima facie obvious. Claim 2 is rejected as the applied art suggests p-type GaN or AlGaIn material for ohmic contact to apply a necessary voltage. Claim 3 is rejected as the applied art suggests quantum wells and barriers of similar number, for example, Raisky teaches 21 periods of wells and barriers. Claim 4 is rejected as Raisky teaches a single n-doped layer and Cho teaches a single layer or multiple doped layers. Claim 5 is likewise rejected. Claim 6 is rejected as Cho teaches similar doping levels to populate the wells and Raisky teaches doped contact layers which ordinarily would have high doping to ensure ohmic contact. Claim 7 is rejected as the n-ohmic contact layer is 0.1um. Claims 8-15 are rejected as the prior art shows similar structure and there is no particularly claimed structure which would distinguish over Cho or Raisky. Claim 16 is rejected as Cho teaches large band offset and the claimed formula merely describes the function of Cho, Raisky, or applicant's device. Claims 17 is rejected as undoped well and barriers from Raisky are "semi-insulating".

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There are no particularly claimed dopant levels or resistance values. Claim 18 is rejected as above. Claim 19 is rejected as the well/barrier structure of Cho (or Raisky) must necessarily be one or another of the recited structure. Claim 20 recites a broad array of materials which encompasses the materials of Cho. Claim 21-27 are rejected as the functional language does not structurally distinguish the claims over the applied art. Claim 28 is rejected as the p and n type ohmic contact layers of Raisky have a larger bandgap than the I type region and the functional language merely describes the operation of a Raisky with Cho type device. Claim 29 is rejected as Cho teaches absorption in these regions. Claim 30 is rejected as Cho teaches the device as an infrared emitter.

Claims 31-35 are allowed.

These claims recite specific structure that is not fairly suggested by the applied art.

Razeghi '324 and Schaff '003 are relevant art.

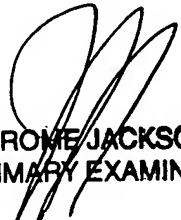
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerome Jackson Jr. whose telephone number is 571 272 1730. The examiner can normally be reached on t-th 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571 272 1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jj

  
JEROME JACKSON  
PRIMARY EXAMINER